

**FISH AND WILDLIFE SERVICE
POLLUTION CONTROL**

Pollution Control

Part 561 Compliance Requirements

Chapter 11 Radioactive Materials

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11.1 What is the purpose of this chapter? This chapter provides guidance for management of radioactive materials at Fish and Wildlife Service facilities.

11.2 Who is responsible for the program?

A. The Chief, Division of Engineering will provide guidance on specific licensing requirements and the handling, storing, and disposing of radioactive materials and Low Level Radioactive Waste (LLW).

B. The Chief, Division of Safety, Health and Aviation will provide guidance on the health aspects of handling, storing, and disposing of radioactive materials and LLW.

C. Regional Safety Managers will assist Service managers at facilities in the Region that handle, store, and dispose of radioactive materials and LLW.

D. Regional Compliance Coordinators will assist Service managers in complying with pollution control requirements for radioactive materials.

E. Project Leaders/Facility Managers will manage radioactive materials in accordance with all applicable Federal, State, and local regulations. They will also budget for and manage any required abatement projects dealing with LLW.

11.3 What are the authorities for this chapter?

A. Atomic Energy Act of 1954, 42 U.S.C. 2021.

B. Low Level Waste Radioactive Waste Policy Act of 1980, Public Law 96-573, as amended by the Low Level Radioactive Waste Amendments Act of 1985, Public Law 99-240.

C. 10 CFR 30-35, Nuclear Regulatory Commission (NRC), Licensing Requirements.

D. 10 CFR 61, NRC, Licensing Requirements for Land Disposal of Radioactive Waste.

E. 10 CFR 71, NRC, Packaging and Transportation of Radioactive Material.

F. 49 CFR 171-180, Department of Transportation (DOT), Hazardous Materials Regulations.

11.4. What are the definitions for some terms used in this chapter?

A. Byproduct Material. Any radioactive material (except special nuclear material) yielded in or made radioactive by

exposure to the radiation incident to the process of producing or utilizing special nuclear material.

B. Commission. The Nuclear Regulatory Commission and its duly authorized representatives.

C. Compact. A compact is an agreement entered into by two or more States pursuant to the Atomic Energy Act of 1954, 42 U.S.C. 2021b, et seq.

D. Curie. That amount of radioactive material that disintegrates at the rate of 37 billion atoms per second.

E. License. A license for byproduct material issued pursuant to the regulations issued under 10 CFR 30-36, 39. A licensee means the holder of such a license.

F. Low-Level Radioactive Waste (LLW). Radioactive material that is not high-level radioactive waste, spent nuclear fuel, or byproduct material (as defined in Section 11e.(2) of the Atomic Energy Act of 1954), and that the NRC, consistent with existing law, classifies as LLW.

G. Sealed Source. Any byproduct material that is encased in a capsule designed to prevent its leakage or escape.

H. Specific activity. The radioactivity of a radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the radioactivity per unit mass of the material.

11.5 What is a Radioactive Materials License? Licenses for byproduct material are either specific or general. Specific licenses are issued to named persons upon applications filed pursuant to regulations. General licenses are effective without the filing of applications with the Commission or the issuance of licensing documents to particular persons.

A. Application for Specific Licenses. Some biochemical assays require the use of low level radioactive materials such as tritium, carbon-14, and iodine-125. In some cases, gas chromatograph analysis involves the use of sealed byproduct material such as nickel-63. The use of byproduct materials such as these require specific licenses. In general, the process for obtaining a specific license involves the following steps:

(1) Application for a specific license may be filed by a person in duplicate on NRC Form 313. Information contained in previous applications and statements or reports filed with the Commission may be incorporated by reference. Each application will be signed by the applicant or licensee or a person duly authorized to act on his or her behalf, and will be accompanied by the necessary fee prescribed in 10

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CFR 170.31. No fee is required for renewal or amendment of a license, except as provided in 10 CFR 170.31.

(2) For use of byproduct material in the form of a sealed source (example: Nickel-63), the application should include the source or device by manufacturer and model number as registered with the Commission.

(3) For use of byproduct material in the unsealed form, on foils or plated sources or sealed in glass in excess of quantities listed in 10 CFR 30.72, the application must contain an evaluation showing that the maximum dose to a person offsite due to a release of radioactive materials would not exceed one rem (a dose that will cause the same effect as one roentgen of X-ray or gamma-ray radiation) effective dose equivalent, or an emergency plan for responding to a release of radioactive material.

B. General Licenses. General licenses have been issued to Federal agencies and other public and private entities to acquire, possess, receive, use or transfer, in accordance with the provisions of 10 CFR 31.5 (a) - (d), byproduct material contained in devices designed and manufactured for the purpose of detecting, measuring, gauging or controlling thickness, density, level, interface location, radiation, leakage, or qualitative or quantitative chemical composition, or for producing light or an ionized atmosphere.

11.6 What are transportation requirements for radioactive materials? DOT regulates packaging, labeling, and transport conditions for commercial carriers (49 CFR 171-178), and the NRC reviews and approves its licensees' package design for commercial shipments (10 CFR 71). The NRC regulations are supplemental to those of DOT and primarily pertain to materials with higher activities than covered by the DOT regulations. Licensed materials exceeding specified activity levels (limits on activity levels are known to the licensees) must be shipped in NRC-approved packages having an NRC certificate of compliance. Also, NRC requires advance notification of shipments of wastes across State lines when shipments contain radioactive materials.

11.7 What are the general provisions of the Low-level Radioactive Waste Program?

A. The Low-level Radioactive Waste Policy Act designated the individual States as the responsible level of government for LLW management and encouraged the development of regional compacts (the area consisting of all States that are members of a compact) to implement the policy and establish LLW disposal facilities. Since January 1, 1986, compacts approved by Congress could have the option of restricting the use of these facilities to the disposal of LLW generated within the compact region. Only the States of Washington, Nevada, and South Carolina have

approved commercial burial facilities for LLW and only Nevada and Washington accept liquid wastes.

B. LLW Management. The basic waste management principles and concepts are similar to those for hazardous chemicals. Many of the same concerns for protection of workers, the public, and the environment are used in planning for radioactive waste treatment and disposal.

C. LLW Classification. The NRC has established regulatory requirements for disposal of LLW in 10 CFR 61. This regulation is based on a classification system and a set of corresponding waste-form-acceptance criteria for licensed commercial facilities. The system is based on concentration limits (expressed in curies per cubic meter or microcuries per cubic centimeter) and establishes three categories of waste. The boundaries between classes of waste depend both on the isotope's half-life and the specific activity in curies per cubic meter.

(1) Class A waste consists primarily of shorter-lived isotopes and limited concentrations of longer-lived isotopes. Wastes can be disposed of with only minimum requirements for waste form and characteristics.

(2) Class B waste consists of increased concentration limits for certain isotopes and additional requirements for waste form and characteristics to ensure physical stability after disposal.

(3) Class C waste has greater concentration and stability requirements for physical form, packaging, and characteristics than Class B.

(4) Radioactive wastes with concentrations exceeding Class C values are not acceptable for disposal at commercial facilities without specific approval by the NRC.

D. LLW Packaging. The minimum waste packaging requirements in 10 CFR 61.56 for all classes of waste are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.

(1) Waste must not be packaged for disposal in cardboard or fiberboard boxes.

(2) Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.

(3) Solid waste containing liquid will contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case will the liquid exceed 1% of the volume.

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(4) Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.

(5) Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with 11.7D(7).

(6) Waste must not be pyrophoric; i.e. subject to spontaneous combustion. Pyrophoric materials contained in waste must be treated, prepared, and packaged to be nonflammable.

(7) Waste in gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity must not exceed 100 curies per container.

(8) Waste containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials.

(9) Each package of waste must be clearly labeled to identify its class. The NRC may, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, if it finds reasonable assurance of compliance with the performance objectives of 10 CFR 61, subpart C.

E. Stability of the Waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site. Stability is also a factor in limiting exposure to an inadvertent intruder (a person who might occupy the disposal site after closure), since it provides a recognizable and nondispersible waste.

(1) Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions.

(2) The amount of liquid in liquid waste packages must not exceed 1% free standing and noncorrosive liquid, or 0.5% of the volume of the waste for waste processed to a stable form.

(3) Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.